

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently Amended) A method of generating comfort noise in a speech decoder that receives speech and noise information from a communication channel, comprising:

~~providing interpolating by the speech decoder, a plurality of interpolated comfort noise parameter values normally used by the speech decoder to generate comfort noise;~~

providing background noise parameter values from a receiver buffer;

calculating, at the speech decoder, a mean value of the background noise parameter over a period of time;

calculating, at the speech decoder, variability information indicative of how the background noise parameter varies relative to [[a]] the mean value of the background noise parameter;

in response to the variability information, perturbing the interpolated comfort noise parameter values to produce perturbed comfort noise parameter values; and

selecting at least some of the perturbed comfort noise parameter values for use in generating perturbed comfort noise.

2. (Original) The method of Claim 1, wherein the background noise parameter is a spectrum parameter.

3-4. (Canceled)

5. (Previously Presented) The method of Claim 1, wherein said calculating step includes subtracting the mean value from each background noise parameter value to produce a plurality of deviation values.

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6. (Previously Presented) The method of Claim 5, wherein said perturbing step includes selecting one of said deviation values randomly, scaling the randomly selected deviation value by a scale factor to produce a scaled deviation value, and combining the scaled deviation value with one of the comfort noise parameter values to produce one of the perturbed comfort noise parameter values.

7. (Original) The method of Claim 1, wherein said speech decoder is provided in a radio communication device.

8. (Original) The method of Claim 7, wherein speech decoder is provided in a cellular telephone.

9-11. (Canceled)

12. (Previously Presented) The method of Claim 1, wherein said calculating step includes calculating differences between the mean value and at least some of the background noise parameter values to produce mean-removed values of the background noise parameter.

13. (Previously Presented) The method of Claim 12, wherein said calculating step includes using the plurality of values of the background noise parameter to calculate filter coefficients, and filtering at least some of the mean-removed values of the background noise parameter according to the filter coefficients.

14. (Previously Presented) The method of Claim 13, wherein said calculating step includes calculating filter coefficients of an auto-regressive predictor filter.

15. (Previously Presented) The method of Claim 1, wherein said variability information includes time variability information indicative of how the background noise parameter varies over time.

16. (Canceled)

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17. (Currently Amended) In a speech decoder that receives speech and noise information from a communication channel, [[An]] an apparatus for producing comfort noise parameters for use in generating comfort noise in a speech decoder that receives speech and noise information from a communication channel, said apparatus comprising:

a first input for providing a plurality of interpolated comfort noise parameter values normally used by the speech decoder to generate comfort noise;

a second input for providing values of a background noise parameter from a receiver buffer;

a variability estimator coupled to said second input and responsive to the background noise parameter values for calculating variability information, wherein said variability estimator is responsive to a plurality of values of the background noise parameter for calculating a mean value of the background noise parameter over a period of time, wherein said variability estimator includes a variability determiner for producing variability information indicative of how the background noise parameter varies relative to said mean value of the background noise parameter, and is further operable to calculate differences between the mean value and at least some of the background noise parameter values to produce mean-removed values of the background noise parameter;

a modifier coupled to said first and second inputs and responsive to the variability information indicative of the variability of the mean-removed values of the background noise parameter to the mean value of the background noise parameter for perturbing the comfort noise parameter values to produce perturbed comfort noise parameter values; and

an output coupled to said modifier for selecting at least one of said perturbed comfort noise parameter values for use in generating perturbed comfort noise.

18-24. (Canceled)

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25. (Previously Presented) The apparatus of Claim 17, wherein said variability information includes time variability information indicative of how the background noise parameter varies over time.

26. (Original) The apparatus of Claim 25, wherein said variability estimator includes a coefficient calculator responsive to a plurality of values of the background noise parameter for calculating filter coefficients, said time variability information including the filter coefficients.

27. (Original) The apparatus of Claim 26, wherein said filter coefficients are filter coefficients of an auto-regressive predictor filter.

28. (Original) The apparatus of Claim 26, including a filter coupled to said coefficient calculator for receiving therefrom said filter coefficients, and coupled to said mean variability determiner for filtering at least some of the mean-removed background noise parameter values according to said filter coefficients.

29. (Original) The apparatus of Claim 26, wherein said coefficient calculator is provided in the speech decoder.

30-31. (Canceled)

32. (Previously Presented) The method of Claim 1, wherein said calculating step includes combining the variability factors for the background noise parameter with the interpolated comfort noise parameter values on a frame basis.

33. (Previously Presented) The method of Claim 1, wherein said calculating step includes determining at least one variability factor from a group consisting of:

- time rate of change;
- variance from a mean value;
- maximum deviation from a mean value; and
- zero crossing rate.

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34. (Previously Presented) The apparatus of Claim 17, wherein the selection of said perturbed comfort noise values is determined by the sequential order of said buffered background noise parameter values.

35. (Previously Presented) The apparatus of Claim 17, wherein said perturbed comfort noise values are selected randomly.

36. (Previously Presented) The apparatus of Claim 17, wherein the frequency of selection of said perturbed comfort noise parameter values can be set to a predetermined value.

37. (Previously Presented) The apparatus of Claim 17, wherein the modifier randomly selects one of the mean-removed values, scales the randomly selected mean-removed value by a scale factor to produce a scaled mean-removed value, and combines the scaled mean-removed value with one of the comfort noise parameter values to produce one of the perturbed comfort noise parameter values.